

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL/MAY 2005

(Vocational Course)

Branch : Instrumentation

VACUUM INSTRUMENTATION

Time : Three Hours

Maximum : 60 Marks

Part A

*Answer any eight questions in one or two sentences each.
Each question carries 2 marks.*

1. Define one torr in vacuum measurement.
2. Define one micrometer in vacuum measurement.
3. Which are the losses in pumping speed ?
4. Define Pump-down time.
5. Name any *four* vacuum applications in industries.
6. Specify any *two* advantages of diffusion pumps.
7. The pressure in the vacuum system indicated is 20mm. of Mercury. What is the pressure corresponds to pounds per square inch (PSi).
8. Define the term Sputtering.
9. Define the Sensitivity of an ionization guage.
10. Define the term Knudsen number.
11. What is the range of application of thermal conductivity guage ?
12. Mention any *two* applications of thin film.

(8 × 2 = 16 marks)

Part B

*Answer any six questions in one or two paragraphs each.
Draw neat sketches if necessary.
Each question carries 4 marks.*

13. Explain the working of oil free pumps.
14. Explain the working of any *one* absorption pumps.
15. With the help of a neat sketch explain the working of thermal conductivity guage.
16. Explain the working of valves in a vacuum systems.
17. Explain the thermal evaporation techniques.
18. Explain any *one* leak detection techniques in a vacuum system.

19. What are the advantages and disadvantages of sputtering technique ?
20. Explain the vacuum application in lamp industry.
21. Write a note on vacuum materials.
22. Sketch some design of Traps.
23. Explain the working of a Helium leak detector.
24. Explain the principle of operations of a Mass-Spectrometer.

(6 × 4 = 24 marks)

Part C

*Answer any two of the following questions.
Each question carries 10 marks.*

25. With the help of a neat sketch explain the working of McLeod gauge. Mention the advantages in calibration.
26. Discuss in detail the techniques employed in Ultra high Vacuum system.
27. Explain the working of Turbo molecular and ion pumps.
28. Discuss in detail about the techniques employed for fabrication.

(2 × 10 = 20 marks)